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AIR FORCE SYSTEMS COMMAND:

DELIVERING THE FUTURE

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AIR FORCE SYSTEMS COMMAND
OFFICE OF HISTORY

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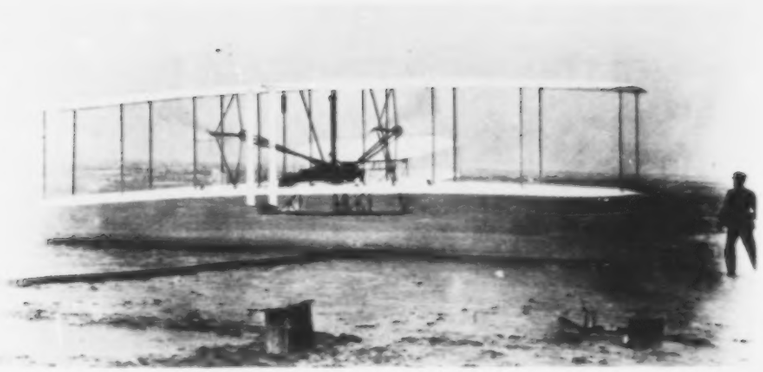
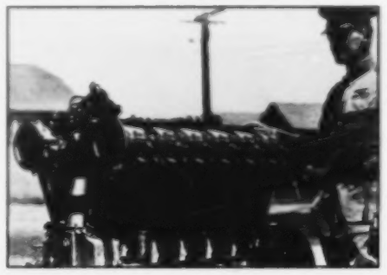


The Early Days

American interest in aviation research and development (R&D) began only a few years after the Wright brothers' maiden flight at Kitty Hawk, North Carolina. In 1907, the U.S. Army established an aeronautical division in the Signal Corps. Eight years later the National Advisory Committee for Aeronautics (NACA) began operation. Aviation R&D was spurred in 1917, when an experimental facility was established by the Signal Corps at McCook Field, Ohio. Redesignated the Engineering Division of the U.S. Army Air Service in March 1919, this organization carried out the research, development and testing of military aircraft, engines, airships and accessories. Renamed the Materiel Division of the newly established Army Air Corps in October 1926, it undertook the procurement, supply and maintenance activities of Army aviation. The Engineering Division and the Materiel Division played central roles in fostering technical progress and maintaining an industrial base in American aviation during the interwar period.

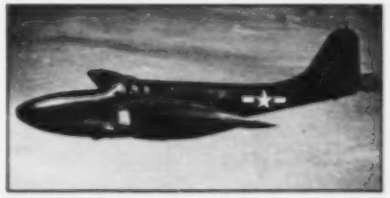
Despite the organizational achievements, aeronautical research received little fiscal backing from the federal government. During the period 1903-1913, approximately $435,000 was provided for aeronautical development. In the same period, Germany spent $28 million and at least seven other nations exceeded U.S. outlays. While Germany poured vast resources into R&D, the Congress and military leaders did little more than debate it.



The Liberty Engine and Major H. "Hap" Arnold, circa: 1919

World War II

American aviation development fell behind its European rivals after the mid-1930s when Germany started a continental arms race. The threat of war at the decade's end began to change the situation. During the late 1930s American industry spent over $100 million annually on aviation research. University grants grew and military personnel enrollment in science courses increased. Leaders of the Army Air Forces (AAF) were alarmed by many of the new weapons that would revolutionize air warfare which had emerged from foreign laboratories. Radar, jet aircraft and ballistic missiles had all either originated or been perfected outside the U.S. Congress greatly increased funds for R&D.



America's first jet airplane, the Bell XP-59A Airacomet

Among the first to recognize the growing potential for postwar aviation R&D was Gen. Henry H. "Hap" Arnold, Commanding General of the Army Air Forces (AAF). The war had shown the destructiveness of aerial attack and made Arnold an aggressive advocate for aeronautical research. On November 7, 1944, he directed the AAF Scientific Advisory Group (SAG) to study the technological achievements of America's wartime allies and adversaries and provide a blueprint of the technologies likely to mold aviation's future.

Boeing B-29 Superfortress

Dr. Theodore von Karman, one of the world's eminent authorities on aeronautics, was selected to chair the inquiry. Two reports resulted: Where We Stand (August 1945) and Science, The Key to Air Supremacy (December 1945). These studies (part of a multi-volume series entitled Toward New Horizons) provided powerful support for those in favor of large-scale, peace-time R&D and helped lay the foundations for the Air Force's postwar emphasis on science and advanced technology.

Gen. Henry H. "Hap" Arnold

Postwar R&D

General Arnold accepted von Karman's recommendations but other institutional issues took precedence. First, the AAF needed to achieve independence, which it did on September 18, 1947, with its transition into an independent Air Force. Second, someone needed to define the role of the USAF. This prompted President Harry S. Truman to establish the Air Policy Commission under the Chairmanship of Mr. Thomas K. Finletter, second Secretary of the Air Force, to formulate an integrated national aviation policy. The Finletter Commission published its report, Survival in the Air Age, in January 1948. It set forth a new concept of airpower, i.e., a powerful peacetime force able to counter any enemy air attack.

Northrop XB-49 Flying Wings

Chuck Yeager and the Bell X-1 broke the sound barrier in 1947

Dr. Theodore von Karman

Mr. Thomas K. Finletter

Creation of a New R&D Command

The Finletter Report inspired a group of senior officers with backgrounds in engineering and related fields to analyze the existing R&D organization. Among these staff officers was Brig. Gen. (later Lt. Gen.) Donald L. Putt. A friend and former student of Dr. von Karman, Putt had extensive development experience, an advanced degree in electrical and aeronautical engineering, and a belief that technical innovation would provide the margin of victory in future wars.

Dr. Theodore von Karman and Lt. Gen. Donald L. Putt discuss aviation research issues with a NATO officer.

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North American F-86 Sabres

As Director of Air Staff R&D, General Donald Putt and a small group of junior officers he called his "Young Indians," formulated a single R&D goal: establishment of a separate Air Force command for research and development. Putt persuaded Vice Chief of Staff Gen. Muir S. Fairchild to direct the USAF Scientific Advisory Board (SAB) to study Air Force R&D practices. Dr. von Karman, the SAB chairman, appointed a distinguished ad hoc panel of scientists to review the question. Their findings, and the salesmanship of Gens. Jimmie H. Doolittle and Putt, convinced Air Force Chief of Staff Gen. Hoyt S. Vandenburg to put the R&D mission on a more equal footing with the operational Air Force. Accordingly, and in the face of intense Air Staff opposition, on January 23, 1950, the Research and Development Command (RDC) came into being. Eight months later it was redesignated the Air Research and Development Command (ARDC) and was located in Washington, D.C., with Maj. Gen. David M. Schlatter in command. It would operate with complete autonomy from the production and logistics-oriented Air Materiel Command (AMC). Previously, R&D had been AMC's responsibility.

Dr. James H. Doolittle, Lt. Gen. USAF (Retired)

The Bell X-2 attained Mach 3.2 and 126,000 feet altitude

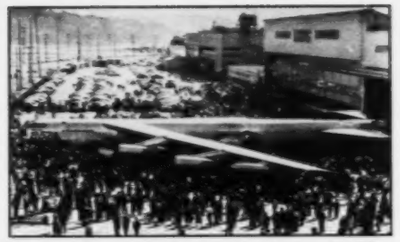
The ICBM Era

During the 1950s, the new command began to make its mark. Working with AMC in joint Weapons Systems Project Offices, it developed many ambitious aircraft and missile protoypes. Among the successes of this period were the F-86, B-52, C-130 and U-2. But most important of the development efforts to national security was the Intercontinental Ballistic Missile (ICBM) program.

Approximately nine months after the U.S. detonated the first thermonuclear (hydrogen) bomb, a startled world learned on August 23, 1953, that the Soviet Union had detonated a similar device. As the race for ICBMs began, a cadre of Air Force officers convinced DOD leaders to speed up the development process. Rather than follow sequential acquisition--taking one step at a time with each step hinging on to the previous one--they pressed for concurrent development of systems components.

North American X-15 pioneered hypersonic flight

This radical approach got underway during the summer of 1953. Secretary of the Air Force Harold E. Talbott asked his Special Assistant for R&D, Mr. Trevor Gardner, to initiate an Air Force missile review. With the support of the Strategic Missiles Evaluation (Teapot) Committee, Gardner pushed ahead for a revamped, accelerated, and centrally managed ICBM program. He recommended Brig. Gen. Bernard A. Schriever, Assistant for Development Planning on the Air Staff, to serve as ICBM Project Chief. On May 5, 1954, General Schriever was named Commander of the soon-to-be created Air Force Western Development Division (WDD), a field office of ARDC charged with ICBM development.



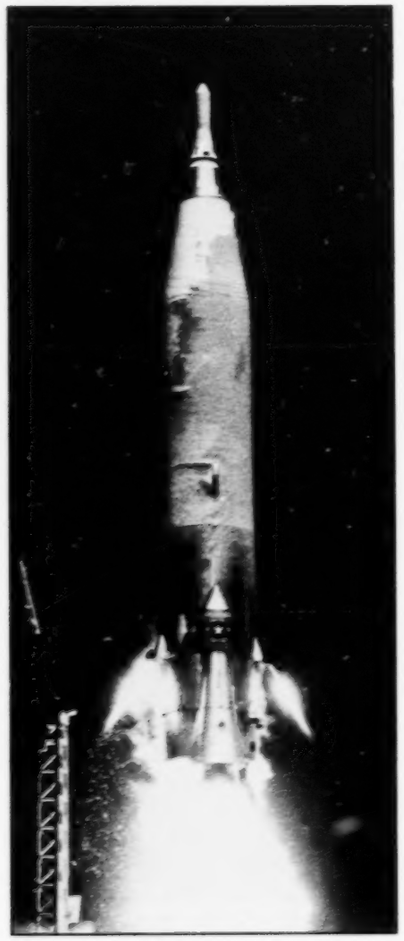
Rollout of the Boeing B-52A Stratofortress

Mr. Trevor Gardner with Secretary of the Air Force Harold E. Talbott

Lt. Gen. Bernard A. Schriever (later Gen. as first commander of AFSC)

Air Force Western Development Division, Inglewood, California

Employing a concurrent development strategy, General Schriever led the highly successful crash program to field America's first ICBM (the Atlas), which became operational in 1959. In terms of importance, resources, and success, the ICBM program was rivaled only by the famed Manhattan Project of WW II.



Atlas Missile

A New Weapons Command

General Schriever's successful ICBM experience convinced him that the entire responsibility for deploying new weapons systems -- from research, development and testing through procurement and production -- should be vested in one command, rather than split between AMC and ARDC. But Schriever had to overcome strong institutional resistance to this idea.

After the Soviet launch of Sputnik on Octobe 1957, Dr. H. Guyford Stever, M.I.T. physics professor and chairman of the SAB Ad Hoc Committee on Research and Development, published a study which greatly influenced HQ USAF and ARDC thinking. The Stever Report, completed in June 1958, proposed a new Air Force command for weapons acquisition. With this report and a realization of DOD's burning desire to assign the military space mission to the Air Force, Schriever won the approval of Secretary of Defense Robert S. McNamara for a new command.

Dr. H. Guyford Stever

On April 1, 1961, ARDC's research, development and test functions were combined with the systems acquisition responsibilities of AMC to form Air Force Systems Command (AFSC). Simultaneously, AMC's maintenance and supply activities were transferred to the newly created Air Force Logistics Command (AFLC).

Fairchild A-10 Thunderbolt II's in trail

Ironically, just as Schriever had consolidated Air Force weapons acquisition in one command, Secretary McNamara was instituting powerful centralization tools in acquisition such as the total package procurement concept (TPPC). This system shifted many major program management functions to the Pentagon. Stressing computer modeling, concurrency, and paper competitions among the contractors, TPPC sharply curtailed the flexibility of Systems Command program managers. Cost overruns and serious technical difficulties in such TPPC programs as the C-5 and F-111 lead to drastic changes in DOD acquisition practices.

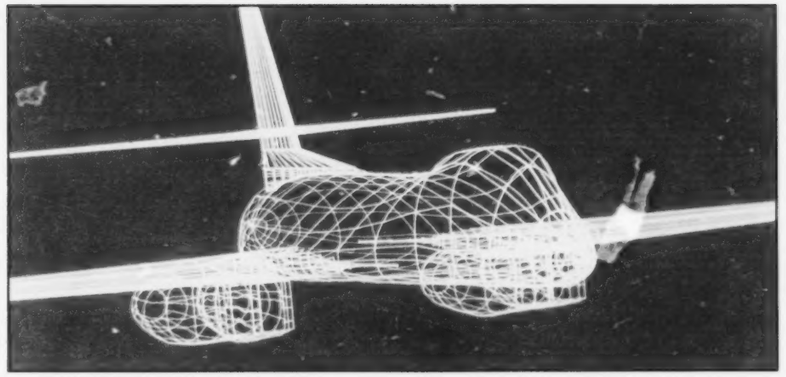
In 1970, Deputy Secretary of Defense David Packard revised many McNamara policies. He decentralized the acquisition system and reemphasized prototyping in weapons development.

Vietnam and Aftermath

As the Vietnam War dominated the late 1960s and early 1970s, AFSC focused on quick solutions to the needs of operational units in Southeast Asia (SEA). Areas such as electronic warfare were greatly expanded in response to the North Vietnamese air defense systems. The modification of transports into gunships, improved reconnaissance sensors, the Defense Meteorological

Lockheed AC-130 Spectre gunship

Fairchild AC-119 Stinger gunship over South Vietnam



Computer-aided design/computer-aided manufacturing (CAD/CAM) was an outgrowth of AFSC technology

Satellite Program, Forward Looking Infrared Sensors (FLIRS), and precision guided munitions all represented significant AFSC contributions to Air Force operations in SEA.

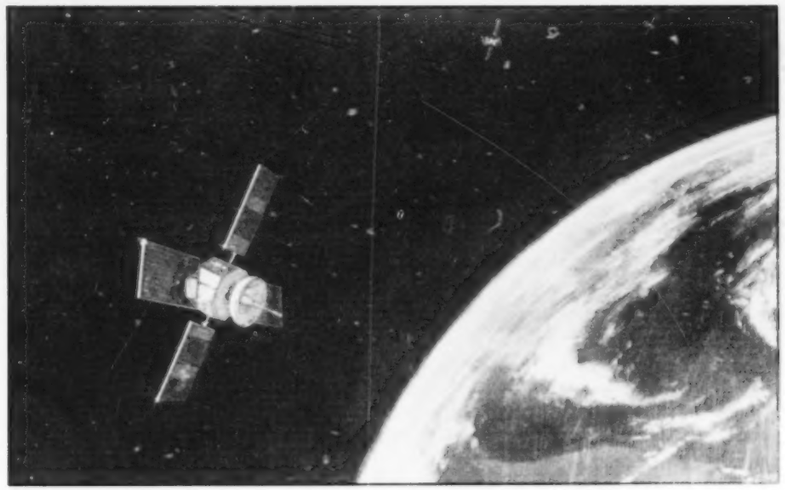
The Vietnam War and the Kennedy Administration's shift to a flexible response strategy also underscored the need to modernize the Air Force's tactical air capabilities. The sustained growth of Soviet power after the Cuban missile crisis challenged the entire spectrum of U.S. military capabilities. These factors led to a new wave of Air Force weapons development beginning in the late 1960s. Systems Command found itself managing a broad array of new tactical and strategic programs including the F-15 and F-16 fighters, the Peacekeeper ICBM, ground and air-launched cruise missiles, the Airborne Warning and Control System, the C-17 transport, the B-1B bomber, and a new generation of surveillance satellites. These programs were the mainstay of AFSC activities during the 1970s.

General Dynamics F-16, Fighting Falcon

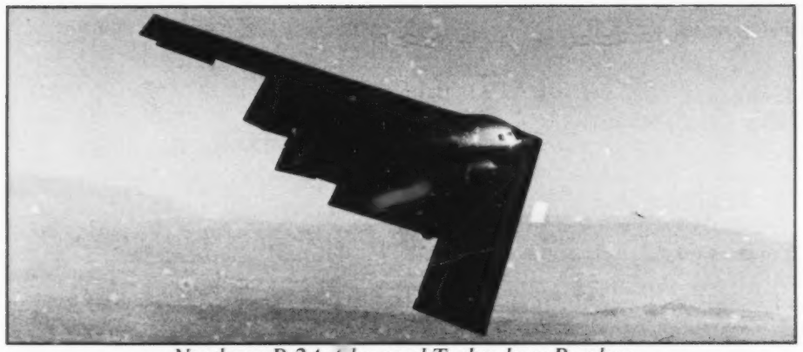
Rockwell B-1B strategic bomber

And Onward

With the Reagan Administration's military buildup during the 1980s, the pace and scope of Air Force acquisition again escalated. Now the focus centered on the modernization of strategic systems which had atrophied during the Vietnam era and afterward. But increased activity and defense spending brought acquisition reform issues to the forefront. Cost, schedule, and quality problems troubled some major weapons programs. Media stories about spare parts overpricing and questionable contractor overhead charges created a national sensation. This negative publicity, coupled with soaring federal deficits and cuts in domestic spending, contributed by the middle of the decade to a political backlash against the President's military programs. The situation gave enormous political impetus to reductions of defense spending and an overhaul of the nation's military establishment, including its weapons acquisition practices. AFSC led the way for acquisition improvements -- greater reliance on multi-year contracting to stabilize weapons programs and increased investment in modernization programs for the defense industrial base. But internal efforts to improve the weapons acquisition process were soon eclipsed by external pressures: Congress passed a massive and diverse volume of reform legislation, increasing the legislative oversight of acquisition programs. The administration responded with the President's Blue Ribbon Commission on Defense Management (the Packard Commission) which found its way into legislation and was supplemented by the congressional Goldwater-Nichols DOD Reorganization Act in 1986.



Navigation System Using Time and Ranging (NAVSTAR), Global Positioning System (GPS)



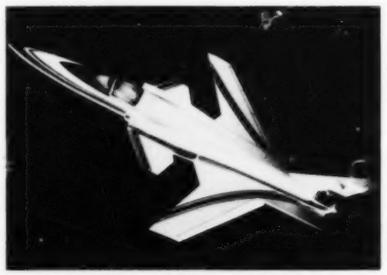
Northrop B-2A Advanced Technology Bomber

During this turbulent period, new and updated weapons systems continued to upgrade our forces. The B-1B was delivered in record time. Stealth technology, born in the AFSC laboratories in the 1960s, found its way to the ramps in the form of the F-117 and the B-2. After the Challenger disaster, AFSC helped restore the nation's space launch capability by quickly making available a family of new expendable launch vehicles. Major gains were made in operational readiness rates through the Reliability and Maintainability (R&M) 2000 program. This program put technology to work on fielded systems and made exponential leaps in the reliability and maintainability of on-line weapon systems.

Nonetheless, institutional reforms continued. In February 1989, President George Bush directed the Secretary of Defense (SECDEF) to develop a plan to improve weapons procurement and Pentagon management. The resulting "Defense Management Review" (DMR) was designed to fully implement the recommendations made by the Packard Commission in 1986. The SECDEF directed each of the military departments to develop proposals for achieving the DMR's objectives. The changing Soviet threat, deficits and the high cost of modern technology again triggered major reassessment of R&D's role.

Conclusion

Since ARDC's and AFSC's founding, the course of Air Force weapons acquisition has often been altered by external forces: the foreign threat, Congressional direction, and public perceptions. But the constant factor throughout has been AFSC's ability to survive the turmoil and provide this nation with the world's finest aerospace systems.



Grumman X-29 Advanced Technology Demonstrator

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The Office of History gratefully acknowledges Dr. Alfred Beck, Air Force Office of History, Mr. Dana Bell, and Mr. Victor Govier, Smithsonian Institution, Dr. Richard Hallion, Dr. Phillip Tucker and Mrs. Yvonne Kinkaid, HQ AFSC, and many others who have generously offered their time, knowledge and resources to this project.

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